

WE CLAIM:

1. A method in a parallel database system having a front end server for analyzing queries about a database and a plurality of database operation servers for operating said database, said front end server being connected with said database operation servers by a network, said database operation servers retrieving data from said database, and said front end server processing and controlling retrieved data, said method comprising the steps of:

causing a database operation server, upon retrieval of data including a plurality of sub-data items, to return location information about said data as a retrieval result to said front end server; and

retrieving said sub-data items of said data from said database operation server based on said location information so that any of said sub-data items in said data is used for processing, control and database operations subsequent to the retrieval of said data.

2. A method according to claim 1, wherein said retrieving step retrieves said sub-data items of said data from said database operation server based on said location information and dictionary information concerning locations of said sub-data items within said data and sub-data identifiers necessary for queries.

3. A method according to claim 1 further comprising the step of:

performing a process using the retrieved sub-data items.

4. A method according to claim 2 further comprising the step of:

performing a process using the retrieved sub-data items.

5. A method according to claim 1, wherein said location information comprises:

an identifier of said database operation server having retrieved said data and an address of said data within said database operation server.

6. A method according to claim 2, wherein said dictionary information of locations of said sub-data items within said data comprises:

offset values representing locations of said sub-data items relative to a starting address, said sub-data items being clustered within said data.

7. A method according to claim 2, wherein said data comprises:

offset values representing locations of said sub-data items relative to a starting address, said sub-data items being clustered within said data, and

wherein a sub-data item is retrieved by use of said offset value extracted.

8. A method according to claim 4, wherein, when said process using said retrieved sub-data items is an update of the retrieved data, an internal-format procedure for providing an update is sent together with said location information of said data and said dictionary information of the locations of said sub-data items to said database operation server, so that said internal-format procedure in operation uses the retrieved sub-data items on the side of said database operation server.

9. A method in a parallel database system having a front end server for analyzing queries about a database and a plurality of database operation servers for operating said database, said front end server being connected with said database operation servers by a network, said database operation servers retrieving data from said database, and said front end server processing and controlling retrieved data, said method comprising: A

a first process of causing a database operation server, upon retrieval of data including a plurality of sub-data items, to return location information about the retrieved data as a retrieval result to said front end server, and retrieving said sub-data items of said data from said database operation server based on said location information so that any of said plurality of sub-data items in said data is used for processing, control and database operations subsequent to the retrieval of said data; and

a second process of causing a database operation server, upon retrieval of data including a plurality of

sub-data items, to return the retrieved data including sub-data items as a retrieval result to said front end server, and retrieving said sub-data items of said data from said front end server for processing, control and database operations subsequent to the retrieval of said data,

wherein one of said first and second processes is selected in accordance with predetermined selection criteria upon analysis of a query, so that an internal-format procedure corresponding to the selected process is generated and executed.

10. A method according to claim 9, wherein in said first process said sub-data items of said data is retrieved from said database operation server based on said location information and dictionary information about locations of said sub-data items within said data and said sub-data identifiers necessary for queries.

11. A method according to claim 9, wherein said first process further comprises:

performing a process using the retrieved sub-data items.

12. A method according to claim 10, wherein said first process further comprises:

performing a process using the retrieved sub-data items.

13. A method according to claim 10, wherein said predetermined selection criteria involve calculating costs of said first and said second processes based on said dictionary information including sub-data lengths, and comparing the two processes in terms of calculated costs, so that a more cost-effective one of said two processes is selected.

14. A method according to claim 10, wherein said predetermined selection criteria require that said first process be selected if any sub-data item within said data is longer than a reference value stipulated by the system, and that said second process be selected if no sub-data item within said data is longer than said reference value.

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15. A method according to claim 10, wherein, upon retrieval of data including a plurality of sub-data items, a result of processing returned from said front end server to a user application program includes flag information indicating either that said data has been transferred to said front end server or that not said data but location information of said data has been transferred to said front end server; and

wherein said flag information is used to generate an internal-format procedure corresponding to either said first process or said second process which has been selected, so that any of said plurality of sub-data items in said data is used for processing, control and database operations subsequent to the retrieval of said data.

16. A parallel database retrieval system comprising:
a front end server for analyzing queries about a
database; and
a plurality of database operation servers for
operating a database, said database operation servers being
connected to said front end server by a network,
wherein said database operation servers retrieve data
from said database, and said front end server processes and
controls data retrieved by said database operation controllers,
and
wherein said front end server causes a database
operation server, upon retrieval of data including a plurality
of sub-data items, to return location information about said
data as a retrieval result to said front end server, and
retrieves said sub-data items of said data from said database
operation server based on said location information so that any
of said sub-data items in said data is used for processing,
control and database operations subsequent to the retrieval of
said data.

17. A parallel database retrieval system according to
claim 16, wherein said front end server retrieves said sub-data
items of said data from said database operation server based on
said location information and dictionary information concerning
locations of said sub-data items within said data and sub-data
identifiers necessary for queries.

18. A parallel database retrieval system according to

23. A parallel database retrieval system according to claim 19, wherein said front end server, when said process using said retrieved sub-data items is an update of the retrieved data, sends an internal-format procedure for providing an update together with said location information of said data and said dictionary information of the locations of said sub-data items to said database operation server, so that said internal-format procedure in operation uses the retrieved sub-data items on the side of said database operation server.

24. A parallel database retrieval system comprising:
a front end server for analyzing queries about a database; and

a plurality of database operation servers for operating a database, said database operation servers being connected to said front end server by a network,

wherein said database operation servers retrieves data from said database, and said front end server processes and controls data retrieved by said database operation controllers, and

wherein said front end server performs a first process of causing a database operation server, upon retrieval of data including a plurality of sub-data items, to return location information about the retrieved data as a retrieval result to said front end server, and retrieves said sub-data items of said data from said database operation server based on said location information so that any of said plurality of sub-data items in said data is used for processing, control and

database operations subsequent to the retrieval of said data, and performs a second process of causing a database operation server, upon retrieval of data including a plurality of sub-data items, to return the retrieved data including sub-data items as a retrieval result to said front end server, and retrieves said sub-data items of said data from said front end server for processing, control and database operations subsequent to the retrieval of said data,

wherein one of said first and second processes is selected by said front end server in accordance with predetermined selection criteria upon analysis of a query, so that an internal-format procedure corresponding to the selected process is generated and executed.

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25. A parallel database retrieval system according to claim 24, wherein in said first process performed by said front end server said sub-data items of said data is retrieved from said database operation server based on said location information and dictionary information of locations of said sub-data items within said data and said sub-data identifiers necessary for queries.

26. A parallel database retrieval system according to claim 24, wherein said first process performed by said front end server comprises:

performing a process using the retrieved sub-data items.

27. A parallel database retrieval system according to claim 25, wherein said first process performed by said front end server comprises:

performing a process using the retrieved sub-data items.

28. A parallel database retrieval system according to claim 25, wherein said predetermined selection criteria involve calculating costs of said first and said second processes based on said dictionary information including sub-data lengths, and comparing the two processes in terms of calculated costs, so that a more cost-effective one of said two processes is selected.

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29. A parallel database retrieval system according to claim 25, wherein said predetermined selection criteria require that said first process be selected if any sub-data item within said data is longer than a reference value stipulated by the system, and that said second process be selected if no sub-data item within said data is longer than said reference value.

30. A parallel database retrieval system according to claim 25, wherein, upon retrieval of data including a plurality of sub-data items, a result of processing returned from said front end server to a user application program includes flag information indicating either that said data has been transferred to said front end server or that not said data but location information of said data has been transferred to said

front end server; and

wherein said flag information is used to generate an internal-format procedure corresponding to either said first process or said second process which has been selected, so that any of said plurality of sub-data items in said data is used for processing, control and database operations subsequent to the retrieval of said data.

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